## Space Weather Forecast

Issued on Friday, 28 July 2023 at 01:04 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Daily chance of R1/R2 Minor/Moderate radio blackouts. Slight chance of Minor Storm (G1) Day 4.**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Solar activity has been Moderate over the past 24 hours, the strongest flare emanating from an active region that has now rotated over to the far side and is no longer visible. There are currently up to 10 sunspot regions on the visible disc. There are a couple of large regions but they appear stable and largely inactive. Two regions are however turning increasingly large and complex. They are both on the eastern hemisphere and display a proliferation of spots, some of which contain a rudimentary penumbra.

A small filament was observed lifting off the sun around 27/1330UTC, in the southwest quadrant, leading to a faint CME. The results of the analysis are pending but given its location and estimated velocity, it may give Earth a slight glancing blow in the early UTC hours of Day 4 (31st). No other Earth-directed CMEs were observed.

**Solar Wind / Geomagnetic Activity:** The solar wind most likely remained influenced by the combination of the fading effects of the CME that arrived at Earth on 25 July and a weak connection with the high speed stream originating from CH28/+. The solar wind declined from 510 to 410 km/s but its declining trend became more slow during the second half of the period, remaining slightly elevated. Total magnetic field strength was weak but steady throughout. The important north-south component was also weak and largely positive. This resulted in a Quiet geomagnetic activity (Kp 0-2).

**Energetic Particles / Solar Radiation:** The observed count rate of high energy particles (high energy protons) has been at background levels. No solar radiation storms were observed.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Low to Moderate activity is forecast, with a slight chance of X-flares, most likely from AR3376.

**Solar Wind / Geomagnetic Activity:** A CME which left the southwest quadrant of the sun on 27 July may give Earth a glancing blow on Day 4. However confidence is low. No other CMEs feature in this forecast. Solar winds are currently under the weak influence of CH28 but expected to slowly decline towards background levels, with no further enhancement expected. Geomagnetic activity is expected to be mostly Quiet to Unsettled, but Unsettled to Active with a slight chance of Minor Storm intervals (G1) on Day 4 (31st).

**Energetic Particles / Solar Radiation:** There remains a slight chance of the observed count rate of energetic particles increasing from any significant flares that occur. This risk reduces a little through the period as the active region near the northwest limb rotates across onto the

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farside of the Sun.

**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 1 | 1 | 1 | 10 |
| Strong | G3 | No | 1 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | Yes | 55 | 50 | 50 | 50 |
| Very Active | R3 to R5 X | No | 5 | 5 | 5 | 5 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 10 | 5 | 5 | 5 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |
| * S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$) | | | | | | |

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